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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/079,081	02/18/2002	Peter Bo Holmqvist	38128/193723	7035

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ALSTON & BIRD LLP
BANK OF AMERICA PLAZA
101 SOUTH TRYON STREET, SUITE 4000
CHARLOTTE, NC 28280-4000

EXAMINER

JACKSON, BLANE J

ART UNIT	PAPER NUMBER
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2685

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DATE MAILED: 06/18/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/079,081

Applicant(s)

HOLMQVIST, PETER BO

Examiner

Blane J Jackson

Art Unit

2685

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 February 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☒ Claim(s) 14 and 15 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

2. Claims 1-3, 5, 8-10 and 13 are rejected under 35 U.S.C. 102(e) as being anticipated by Gailus et al. (U.S. Patent 6,449,465).

As to claims 1 and 8, Gailus teaches a transmitter and method for removing at least some out of band signals from a transmitted output signal having a predetermined bandwidth (linear amplification (where output appears as input without distortion) to meet adjacent channel coupled power (ACCP) specifications and intermodulation

distortion performance required for most wireless digital communication systems
(column 1, lines 10 to column 2, line 49) comprising:

A phase modulator for receiving a signal and modifying the phase of the signal
(figure 4, input phase modulator (424)),

A power amplifier for receiving the phase modified signal from the phase
modulator and amplifying the phase modified signal (figure 4, PA (410), happens to be
amplitude modulated via the switching power supply (426)),

A amplitude modulator fro receiving the amplified phase modified signal and
modifying the amplitude of the amplified phase modified signal (figure 4, impedance
modulator (412), column 6, lines 38-61, column 5, lines 7-28) wherein the phase
modification provided by the phas modulator and the amplitude modification provided by
the amplitude modulator cooperate to filter out of band signals from the transmitted
output signal (operation summary: column 7, lines 46-65, class C amplifier provides
high efficiency but inadequate linearity: figure 9, column 14, line 57 to column 16, line
65).

As to claim 2, Gailus teaches the transmitter according to claim 1 further
comprising a non-linear element, wherein the amplitude modulator is downstream of the
non-linear element (figure 4, the non-linear element is the PA (410) followed by an
impedance modulator (412)).

As to claim 3, Gailus teaches the transmitter according to claim 1, further comprising a non-linear element, wherein the phase modulator is upstream of the non linear element (figure 4, input phase modulator (424) in signal path prior to non-linear element PA (410)).

As to claims 5 and 13 with respect to claims 1 and 11, Gailus teaches wherein the transmitter comprises a non-linear power amplifier and wherein applying the amplitude modification comprises applying the amplitude modification by directly modulating the non-linear amplifier (figure 4, switching power supply (426) modulates the PA (410), column 6, lines 12-39).

As to claim 9, Gailus teaches a method according to claim 8 further comprising mixing the phase modified signal with a carrier signal at a carrier frequency prior to the amplitude modification (figure 4, phase modulator (410) is followed by a PA (410) coupled to an impedance modulator (412) where the phase modulator is preferably a phase adjustable frequency synthesizer such as a VCO; column 15, lines 4-7).

As to claim 10, Gailus teaches a method according to claim 8 wherein the phase modification comprises modifying the phase of the signal prior to subjecting the signal to non-linear elements (see discussion for claim 9) and wherein the amplitude modification comprises modifying the amplitude of the signal following operation of any non-linear elements (figure 4, impedance modulator (412), column 6, lines 38-46).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gailus et al. (U.S. Patent 6,449,465)

As to claims 6 and 7, Gailus teaches the amplitude modulator comprises an attenuator with analog control but is silent as to a digitally controlled attenuator (column 6, lines 38-61). However, Gailus also teaches the impedance modulator may be any type of modulator that presents an adjustable impedance to a signal; therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to configure the control and amplitude modulator type of Gailus consistent with the design of the system and yet provide controlled attenuation of the input RF signal.

5. Claims 4, 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gailus et al. (U.S. Patent 6,449,465) with a view to Tetsuya (U.S. Patent 6,741,867).

As to claim 4, Gailus teaches the RF signal is sourced to the power amplifier by the input phase modulator that is a phase adjustable frequency synthesizer (column 14, line 57 to column 15, line 7) but does not teach the transmitter of claim 1 further

comprising an up converter for mixing the phase modified signal with a carrier signal at a carrier frequency prior to the amplitude modulation.

Tetsuya teaches a non-linear distortion compensation circuit where the phase and amplitude of the information signal is adjusted at base band then supplied to a transmitting portion that includes up-conversion circuits followed by a PA, then coupled to a directional coupler to sample output power and then to an antenna multi coupler. Tetsuya teaches the phase and amplitude adjustments are provided for non-linear effects of the non-linear elements of the transmitting portion (figure 1, pre-distortion type linearizer (9) and figure 2, the transmitting portion (10), column 10, lines 32-60). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the simple RF generating circuit of Gailus with the frequency conversion circuits of Tetsuya to accommodate different frequency band mobile telephones.

As to claim 11, Tetsuya teaches a method for removing at least some out of band signals from a signal output by a transmitter including at least one non-linear element comprising:

For each of a plurality of different input signals predetermining an amplitude modification and a phase modification of the respective input signal which would remove at least some out of band spectral signals from the transmitted output signal (figure 1, column 1, lines 30-42, column 7, lines 22-31),

Storing the amplitude and phase modifications for each of the plurality of different input signals (column 7, lines 32-51, column 10, lines 32-60).

Tetsuya teaches applying the amplitude and phase modification to the input signal (figure 1, from the data storage ROM to the Pre-Distortion Type Linearizer (9)) but does not teach independently applying the amplitude and phase modification to the input signal wherein applying the amplitude modification comprises applying the amplitude modification after all non-linear elements of the transmitter.

Gailus teaches a method and apparatus for linear amplification of a RF signal where the phase modification is applied to an input phase modulator (and VCO, figure 4, input phase modulator and VCO (424)) prior to the non-linear component (PA (410)) and the amplitude modification is applied to the impedance modulator (412) signaled by an amplitude error signal (420) after all the non-linear elements of the transmitter (column 6, lines 23-46, column 7, lines 15-25). Since both Gilus and Tetsuya provide circuits to reduce non-linearity effects based on a feedback sample of the RF output, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Tetsuya with amplitude modulation method of Gailus such that errors due to bandwidth limitations of a switching power supply which switching power supply produces the supply voltage to the PA may be overcome.

As to claim 12, with reference to claim 3, Gailus teaches wherein applying the phase modification comprises applying the phase modification prior to the non-linear elements of the transmitter (figure 4, input phase modulator (424) in signal path prior to non-linear element PA (410)).

Claim Objections

6. Claims 14 and 15 are objected to because of the following informalities: As to claim 14, the phrase "such that the filter can be eliminated" in comparison to it being used "for determining phase shift and amplitude variation information produced by the filter" is unclear. It is expected that the claim is amended to clarify the unwanted output effect of the filter is eliminated rather than "the filter" itself. Appropriate action is required.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Ichiyoshi (U.S. Patent 5,699,383) discloses a high power linear amplification using periodically updated amplitude and phase correction values. Nielson (U.S. Patent 6633199) discloses an RF power amplifier with feedback to control amplitude and phase variations to improve linearity.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Blane J Jackson whose telephone number is (703) 305-5291. The examiner can normally be reached on Monday through Friday, 8:00 AM-5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Urban can be reached on (703) 305-4385. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

BJJ


EDWARD F. URBAN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2000